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SPECIFICATION FOR COLOURED CHALKS, MOULDED

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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October 1967

Indian Standard

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Indian Standard

SPECIFICATION FOR COLOURED CHALKS, MOULDED

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 June 1967, after the draft finalized by the Inks and Allied Products Sectional Committee had been approved by the Chemical Division Council.

0.2 The requirements and methods of tests for white, moulded school chalks are prescribed in IS : 2694-1963*. This standard covers coloured moulded chalks.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for coloured moulded chalks, intended primarily for writing on boards with a smooth surface.

2. REQUIREMENTS

2.1 Materials — Chalks shall be made from good quality calcined gypsum with suitable pigments. They shall be of homogeneous mass free from grease, grit and sandy abrasives.

2.1.1 *Freedom from Poisonous and Toxic Materials* — Chalks shall not contain more than 10 parts per million of lead (as Pb) and 10 parts per million of arsenic (as As_2O_3) when tested by the methods prescribed in Appendix A.

2.2 Colours — The chalks shall preferably be of yellow, orange, brick red, blue or green colour.

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*Specification for school chalks, moulded, white.

†Rules for rounding off numerical values (*revised*).

2.3 Finish — Chalks shall be circular in cross-section and tapered at one end, and shall be of smooth uniform shape and size. They shall be free from blow holes bigger than 1 mm.

2.4 Performance — Chalks shall produce freely, without scratching the blackboards, visible and distinct marks that can be easily erased with a piece of dry cloth.

2.5 Chalks shall conform to the requirements given in Table 1 when tested according to the methods prescribed in Appendix B. References to relevant clauses of Appendix B are given in col 4 of the table.

TABLE 1 REQUIREMENTS FOR COLOURED CHALKS, MOULDED

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST (REF TO CL NO. IN APPENDIX B)
(1)	(2)	(3)	(4)
i)	Free moisture, percent by weight, *Max*	5	B-1
ii)	Length of sticks, mm	80 ± 3	B-2
iii)	Diameter at thicker end, mm	11 ± 1 (Tapering by 1·5 to 2·0 mm to 100 mm length)	B-2
iv)	Weight per 100 sticks, g, *Min*	500	B-3
v)	Transverse breaking strength, kg, *Min*	0·45	B-4

3. PACKING AND PACKAGING

3.1 Chalks shall be packed in suitable paperboard containers which offer adequate protection to the chalks during transportation. Chalks shall be tightly packed in the containers so that the alternate sticks point in opposite directions and saw dust or other cushioning materials shall be used to fill up the empty spaces to prevent breakage. Unless otherwise agreed to between the purchaser and the supplier, each box shall contain 100 chalks.

4. MARKING

4.1 All packages shall be marked on the outside with the following information:

a) Name of the material;

b) Colours of the material;

c) Number of chalks in the box;

d) Manufacturer's name or recognized trade-mark, if any; and

e) Identification mark in code or otherwise to enable the lot of manufacture to be traced from records.

4.1.1 The packages may also be marked with the ISI Certification Mark.

Note — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 Representative samples of the material shall be drawn and adjudged as prescribed in Appendix C.

APPENDIX A

(*Clause* 2.1.1)

TESTS FOR FREEDOM FROM POISONOUS AND TOXIC MATERIALS

A-0. QUALITY OF REAGENTS

A-0.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960*) shall be employed in tests.

Note — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-1. PREPARATION OF THE SOLUTION

A-1.1 Procedure — Weigh accurately 20 g of the material and ash it in a crucible. Treat the ash with 25 ml of 1 N sodium hydroxide solution with the aid of heat. Add 100 ml of water; then add, with constant agitation, 1 N dilute hydrochloric acid until the solution is neutral to litmus. Dilute the solution with water to 500 ml in a volumetric flask.

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*Specification for water, distilled quality (*revised*)

A-2. DETERMINATION OF ARSENIC

A-2.1 Procedure — Take 25 ml of the solution as prepared in **A-1** and carry out the test for arsenic as prescribed in IS : 2088-1962*, using for comparison a stain obtained with 0·01 mg of arsenic trioxide (as As_2O_3).

A-2.1.1 The material shall satisfy the requirements of the test if the length and intensity of the stain produced with the material is not greater than that in the control test.

A-3. DETERMINATION OF LEAD

A-3.0 Principle — Lead is determined colorimetrically by visual comparison of the colour produced with sodium sulphide against that produced by a standard lead solution.

A-3.1 Reagents

A-3.1.1 *Dilute Ammonium Hydroxide* — approximately 5 N.

A-3.1.2 *Potassium Cyanide Solution* — 10 percent (*w/v*).

A-3.1.3 *Sodium Sulphide Solution* — 12 percent (*w/v*).

A-3.1.4 *Concentrated Nitric Acid* — conforming to IS : 264-1950†.

A-3.1.5 *Standard Lead Solution* — Weigh accurately 1·60 g of lead nitrate, dissolve in 50 ml of nitric acid and make up to 1 000 ml with water. Dilute one millilitre of this solution to 100 ml with water immediately before use. One millilitre of this standard solution is equivalent to 0·01 mg of lead (as Pb).

A-3.2 Procedure — Take 25 ml of the solution as prepared in **A-1.** Neutralize the excess of hydrochloric acid with ammonium hydroxide, add 15 ml in excess and then add 1 ml of potassium cyanide solution. Dilute with water to 50 ml and add 2 drops of sodium sulphide solution. Carry out a control test using 1 ml of standard lead solution carried through the same steps as for the material and dilute it to the same volume. Compare the intensity of the colour produced in the two tubes.

A-3.2.1 The limit prescribed in **2.1.1** shall be taken as not having been exceeded if the intensity of the colour produced in the test is not greater than that produced in the control test.

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*Modified Gutzeit method of determination of arsenic.

†Specification for nitric acid.

APPENDIX B

(*Clause* 2.5)

TESTS FOR COLOURED CHALKS, MOULDED

B-1. DETERMINATION OF FREE MOISTURE

B-1.1 Procedure — Grind in a mortar about four chalks so as to pass through 1·00-mm IS Sieve (*see* IS : 460-1962*). Weigh accurately about 10 g of the ground sample and spread it in a thin layer in a petri dish. Place it in an oven maintained at 100° ± 2°C till constant weight is obtained.

B-1.2 Calculation

$$\text{Moisture, percent by weight} = \frac{100\,(A - B)}{A}$$

where

A = weight in g of the ground material taken for the test, and

B = weight in g of the material after drying.

B-2. MEASUREMENT OF LENGTH AND DIAMETER

B-2.1 Procedure — Measure the length and diameter at the two ends of full-length chalk pieces by means of calipers and a foot rule calibrated in millimetres or with a sliding caliper gauge.

B-3. DETERMINATION OF WEIGHT

B-3.1 Procedure — Weigh 10 chalks, drawn from the same box (*see* **C-2.2**) at a time, and compute the weight per 100 chalks for each box.

B-3.1.1 The weight computed for each box selected for tests (*see* **C-2.2**) shall not differ by more than 2 percent from the average.

B-4. DETERMINATION OF TRANSVERSE BREAKING STRENGTH

B-4.0 Principle — Transverse breaking strength is determined by subjecting a chalk to successive increments of weights till it breaks.

B-4.1 Apparatus — The apparatus as shown in Fig. 1 shall be of such construction that a chalk can be supported at two points 63 mm apart, and weight applied by means of a loading anvil midway between the two supports and at right angles to the chalk. The assembly consisting of the loading anvil, spindle and weight platform shall weigh approximately

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*Specification for test sieves (*revised*).

500 g. The weight shall be applied by the use of either lead shots or weights.

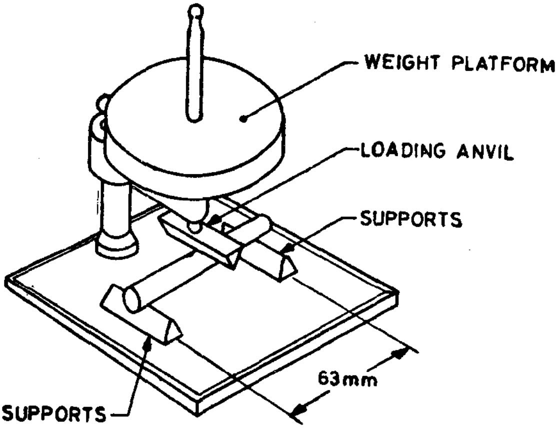

FIG. 1 APPARATUS FOR DETERMINATION OF TRANSVERSE BREAKING STRENGTH

B-4.2 Procedure — Before testing, dry the chalks for a period of 24 hours at 38° ± 3°C to ensure that they are completely dry. Place a chalk in position on the two supporting points so that the central axis of the chalk is horizontal. Then lower the loading anvil carefully until it rests on the chalk in the middle. Add one by one suitable weights carefully to the weight platform until the chalk breaks. The transverse breaking strength of the chalk shall be the sum of the weights of the loading-anvil, spindle, weight platform and any additional weight on the weight platform.

APPENDIX C

(*Clause* 5.1)

SAMPLING OF COLOURED CHALKS, MOULDED

C-1. GENERAL PRECAUTIONS

C-1.1 Samples shall be drawn from originally unopened and undamaged boxes.

C-1.2 Samples shall be protected from abnormal exposure to heat and shall not be allowed to come in contact with any liquid.

C-1.3 Samples shall be handled as little as possible and contact with wet or sweated hands shall be avoided.

C-2. SCALE OF SAMPLING

C-2.1 Lot — In any consignment, all boxes of coloured moulded chalks drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared or known to consist of different batches of manufacture, the boxes belonging to the same batch shall be grouped together and each such group shall constitue a separate lot.

C-2.2 For ascertaining the conformity of the lot to the requirements of the specification, tests shall be carried out for each lot separately. The number of boxes to be selected from lots of different sizes shall be in accordance with Table 2. From each selected box, 10 chalks shall be picked up at random.

TABLE 2 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES

No. of Boxes in the Lot (N) (1)	No. of Boxes to be Selected (n) (2)	Total No. of Chalks to be Selected (3)	Permissible No. of Defective Chalks (4)
Up to 5	1	10	0
6 „ 50	3	30	1
51 „ 100	5	50	2
101 „ 500	10	100	4
More than 500	15	150	6

C-2.2.1 The sample boxes shall be selected at random from the lot. To ensure randomness of selection, random number tables shall be used. If random number tables are not available, the following procedure may be adopted:

> Starting from any box, count all the boxes in the lot as 1, 2, 3, etc up to r and so on in one order where r is the integral part of N/n (*see* Table 2 for N and n). Every rth box thus counted shall be withdrawn to constitute the sample.

C-3. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

C-3.1 All the chalks selected according to **C-2.2** shall be examined for finish (*see* **2.3**) and performance (*see* **2.4**). If the number of defectives found is equal to or less than the corresponding number given in col 4 of

Table 2, the lot shall be declared as conforming to the requirements given in **2.3** and **2.4**.

C-3.2 All the chalks selected according to **C-2.2** shall then be examined for length of the stick and diameter at the two ends. Any chalk failing to meet the requirement of either length or diameter shall be considered as defective.

C-3.2.1 If the number of chalks found defective is less than or equal to the corresponding number given in col 4 of Table 2, the lot shall be deemed to have satisfied the dimensional requirements for the chalks.

C-3.3 The chalks in the sample shall be weighed in groups of 10 and each group shall satisfy the requirement given in item (iv) of Table 1, (*see also* **B-3.1**).

C-3.4 Tests for moisture content and poisonous and toxic materials shall be made on the material got by crushing to required fineness a suitable number of chalks picked up at random from those already in hand. The lot shall be declared as conforming to these requirements if the test results satisfy the specified requirements.

C-3.5 For transverse breaking strength, 5 chalks shall be selected at random from the full length chalks already in hand or directly from the lot. The lot shall be declared as conforming to the requirement of transverse breaking strength if each of the 5 chalks separately satisfies the requirement when tested as in **B-4**.

C-3.6 The lot shall be declared to be in conformity with the requirements of this specification if all the stipulations laid down in **C-3.1** to **C-3.5** are fulfilled.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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